

THERMODYNAMIC PROPERTIES OF SEA-SALT AEROSOLS

A. C. Tridico and I. N. Tang
Environmental Chemistry Division
Department of Applied Science
Brookhaven National Laboratory
Upton, NY 11973

August 1996

For presentation at the
American Association for Aerosol Research
(AAAR) Annual Meeting
Orlando, FL
Oct. 14-18, 1996

ABSTRACT

The thermodynamic properties of mixed salt microdroplets representative of sea-salt aerosols were studied using a single-particle levitation technique. Water activities and densities of solution droplets comprised of varying concentrations and mixtures of Mg^{2+} , Na^+ , Cl^- , and SO_4^{2-} ions are reported.

The single particles were individually suspended in an electrodynamic balance. The relative humidity of the environment was controlled and determined by directly measuring the water vapor pressure in the vacuum cell. Phase transformation of the aerosol particle was monitored by laser light scattering. The behavior of the four ion component hygroscopic particles was strongly dependent on the ion mole fraction. Experimental results of this complex system were compared with theory and a theoretical model for the observed properties is discussed. Additionally, the hygroscopic properties of aerosol particles generated from filtered sea-water samples were studied.